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(54) Domestic appliance cabinet

(57) A domestic appliance cabinet incorporates at least one member (13) in the form of a panel, for example of precoated steel, secured to anoth r member (12), wherein said other member is formed with at least one integral protuberance (15) which extends into an opening or recess in the panel and thereby secures them from relative movement in at least one direction, thereby avoiding the need in many cases for separate rivets or screws. The protuberance is deformed to secure the parts together. Other forms of rivet or tabs may be used.

Fig. 3.

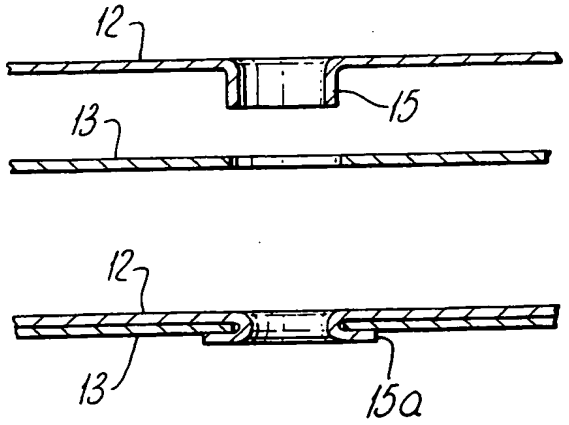


Fig.1.

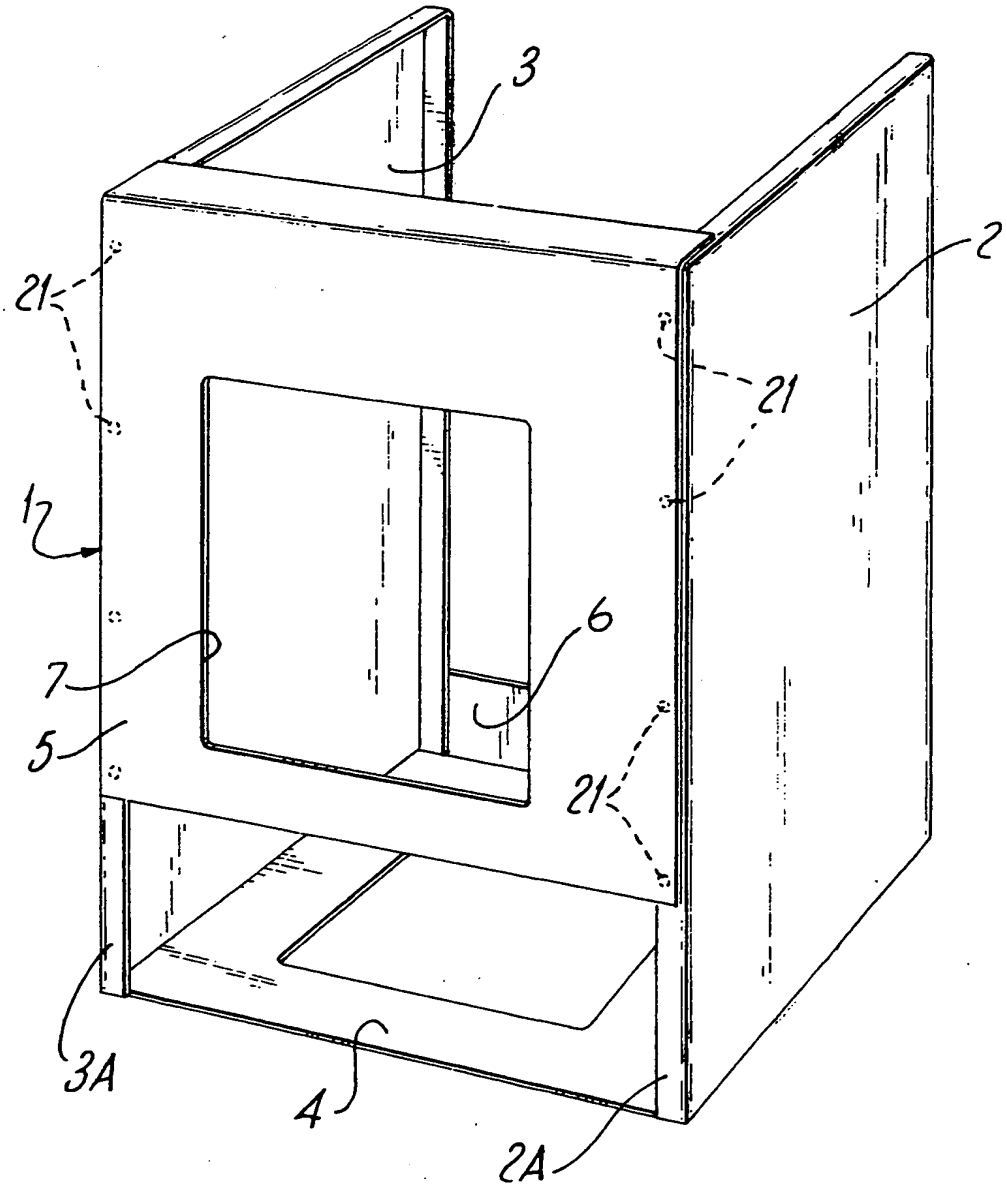


Fig. 2.

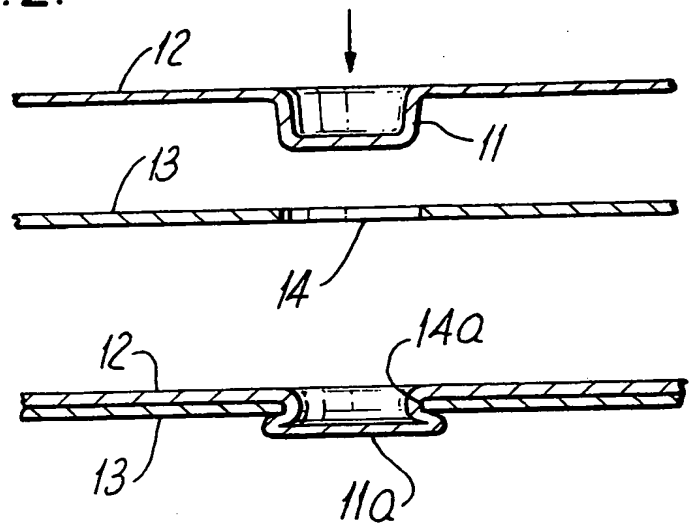


Fig. 3.

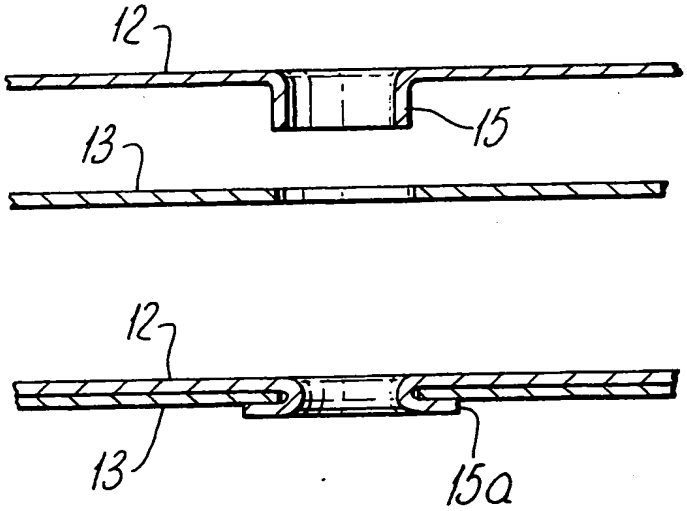


Fig.4.

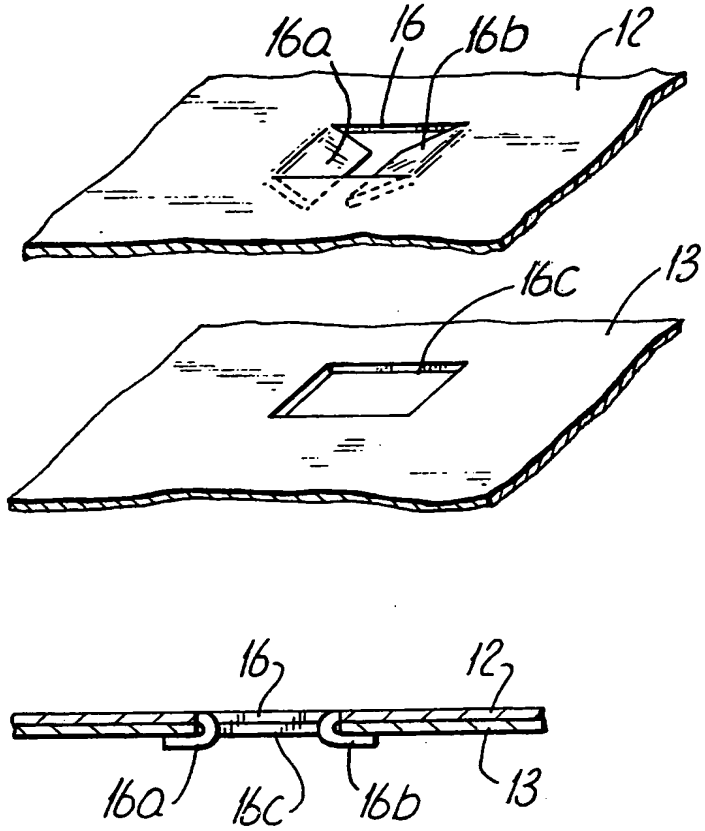


Fig.5.

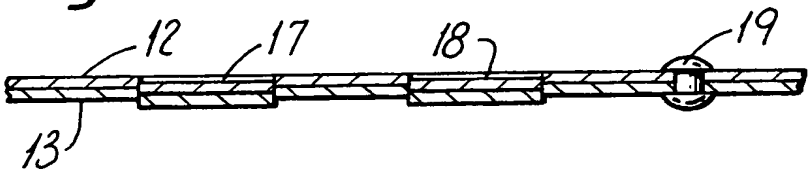
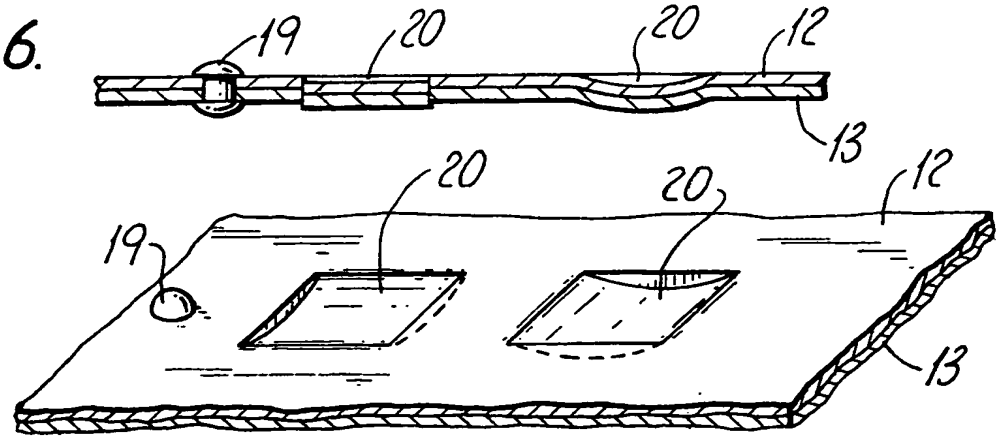


Fig.6.



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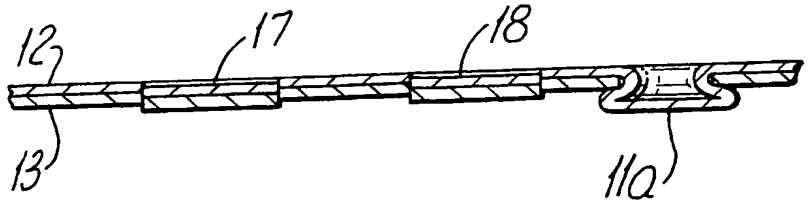


Fig. 8.

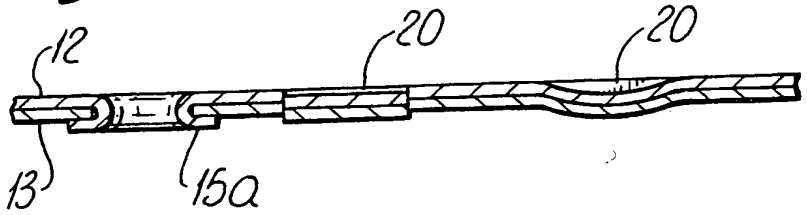
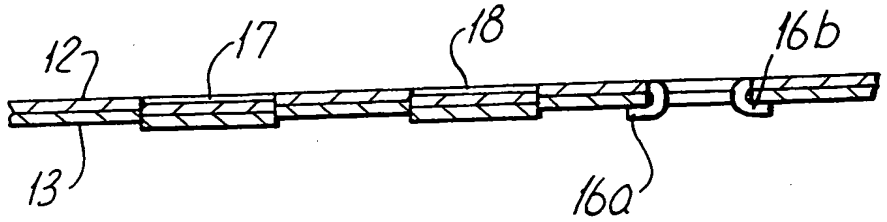


Fig. 9.



SPECIFICATION

Domestic appliance cabinet

This invention relates to the construction of domestic appliance cabinets such as are used as the enclosing casings for washing machines, dishwashers and clothes dryers. It is especially concerned with a form of construction which makes use of pre-coated steel, i.e. a cabinet having one or more panels which have previously been painted or otherwise coated thereby precluding the need for any subsequent painting or coating operation.

Such advantageous use of pre-coated panels does, however, have some limitations. For example it is difficult to resistance weld the panels together or to some other member without incurring cosmetic damage to the panels, which is clearly unacceptable. Further, because of the restrictions which are imposed owing to the limited extent to which the pre-coated material can be formed or shaped, which if exceeded would damage the pre-coated finish, the designer has to adopt a form of construction in which these restrictions are not exceeded.

One of the objects of the present invention is to provide a form of construction in which these limitations are overcome.

Another object of the invention is to provide a form of construction in which use is made of the parent material as a means of fastening the parts of the cabinet together thus avoiding the need for separate fasteners, and thereby providing a cheaper construction.

According to the invention, in a domestic appliance cabinet incorporating at least one member in the form of a panel secured to another member, said other member is formed with at least one integral protuberance which extends into an opening or recess in the panel and thereby secures them from relative movement in at least one direction.

By this means the need for separate rivets, screws or other similar fixing devices can in many cases be avoided.

Thus a protuberance may be deformed following insertion through a co-operating opening in the panel so as to secure the members together in the manner of a rivet.

For example where said other member is of sheet material said protuberance may be in the form of a cup-shaped projection fitted into an opening in the panel and then deformed to cause its sides to extend outward beyond the rim of the opening and engage the outer surface of the panel around the opening, so as to hold the facing surfaces of the panel and member in contact with one another.

Alternatively the protuberance may be provided by a tubular projection fitted into an opening in the panel, the sides of the projection being deform d outwards, for example by swaging, to engage the outer surface of the panel around the opening, so as to secure the members together in the manner of an eyelet.

In another form of the invention a protuberance may be provided by a tab pressed out of the member, inserted through a co-operating hole in the panel and bent over against the surface of the panel.

In a modification of this arrangement a pair of tabs may be fitted into a common opening in the panel and then bent outwards away from each other to engage the outer surface of the panel at opposite sides of the opening.

In some cases the protuberance may extend into a co-operating recess in the panel, and thus secure the panel and member against sliding movement in one or more direction parallel to their mating surfaces. Such an arrangement is relatively strong in shear stress compared with the use of rivets, although weaker in peel strength, but rivets or similar fixing devices, or other forms of protuberances in accordance with the invention, may also be used to give added peel strength. The protuberance and recess may be formed simultaneously by holding the panel and other member in the appropriate relative positions and then part punching them. Several protuberances and associated recesses can be formed together in a single operation.

Thus in general a panel, which may be a pre-painted panel, may be secured to said other member, which may also be a panel, by providing the latter with a plurality of protuberances each extending into a respective opening or recess in the first said panel.

The invention will be further explained by way of example with reference to Figures 1 to 9 of the accompanying drawings, in which

Figure 1 shows a rear view of a partly assembled cabinet construction for a washing machine which embodies the invention, and

Figures 2 to 9 show various methods of integral fastening arrangements according to the invention.

Referring to Figure 1 the construction of washing machine cabinet 1 shown comprises two pre-coated side panels 2 and 3, a base member 4, a rear panel 5 and, between the lower ends of the side panels a front 'kickstrip' panel 6. Additional members (not shown) may include a top panel, a rear, lower panel and a main front panel which would include an aperture providing a loading port for a rotatable clothes drum which, in the fully assembled machine, would be mounted for rotation about a horizontal axis in the cabinet.

Means (not shown) for driving the clothes containing drum within a generally circular container to provide, for example, rotation of the drum in alternate directions at low speed for achieving washing of the clothes and continuously in one direction at high speed for centrifugally extracting moisture from the clothes. An aperture 7 is provided in the rear panel 5 to enable access to b gained to the drum, container and driving means, this aperture being closed by a removable cover, not shown.

Joining of the various parts shown is achieved by use of one or more of the fastening methods shown in Figures 2 to 6. For example the method according

to Figure 2 comprises first forming a cup-shaped projection 11 in one part 12, which may, for example, be a section of the side edge of the rear panel 5, the projection being of such a diameter as to provide a snug fit in a previously pierced circular aperture 14 in a second part 13, for example a turned in flange 2A, 3A of one of the side panels 2, 3. After assembly the two parts are held together by deforming the exposed portion 11a of the projection so as to surround and overlap the rim 14a of the aperture thus providing a firm joint between the parts. A similar method of fixing is shown in Figures 3 and 4, that in Figure 3 comprising a projection in the form of a swaged hole 15, the edges 15a of which are turned back to provide a joint between the two parts 12 and 13 while the arrangement shown in Figure 4 provides a joint in which two sides of a generally square aperture 16, in the form of tabs 16a and 16b in one part 12 are inserted through a similarly shaped aperture 16c in the part 13 and then folded back on themselves against the other part 13 on assembly. For securing the rear panel 5 to the side panel flanges 2A, 3A in any of the ways above described, the edges of the rear panel may be provided with a plurality of spaced projections or tabs, as the case may be, as at 21 which co-operate with suitably positioned apertures in the flanges.

The methods of joining shown in Figures 5 and 6 are such that the parts 12 and 13 are first brought together and then part-punched, as shown at 17 and 18, so as to provide a partial fixing which, whilst ensuring no relative sliding movement between the parts, i.e. in directions parallel to their mating surfaces, needs to be supplemented by additional fixing means such as rivets 19 in order to firmly secure the two parts together. The rivets can, of course, be tubular rivets instead of the solid rivets illustrated. The method shown in Figure 6 is similar to that of Figure 5 but the shape of the depressions is such that the punching 20 needs to be made alternatively at right angles in order to prevent relative sliding movement between the parts but again needs to be supplemented by additional fixing means.

As modifications of the methods shown in Figures 5 and 6 the part-punching, instead of being supplemented by separate fixing means, may alternatively be supplemented by any of the methods illustrated in Figures 2 to 4, for example as shown in Figures 7 to 9, although various combinations of such fixing methods could alternatively be employed.

As stated, one or more of the methods described may be used for assembling parts of the cabinet and it is to be noted that, in general, methods of jointing using the parent material tend to be strong in shear stress and weaker in peel strength, therefore separate fasten rs such as rivets, as shown in Figures 5 and 6, could also be used with th oth r methods described, so as to give added peel strength to an assembly otherwise accomplished by mating of the parent materials, thus giving good shear strength at a minimum of added cost.

In joining two members together by the methods described either member may be formed with protuberances and the other with openings or recesses for accommodating the protuberances depending upon the materials and/or the application.

CLAIMS

1. A domestic appliance cabinet incorporating at least one member in the form of a panel secured to another member, wherein said other member is formed with at least one integral protuberance which extends into an opening or recess in the panel and thereby secures them from relative movement in at least one direction.

2. The manufacture of a domestic appliance cabinet according to Claim 1 wherein the protuberance is deformed following insertion through a co-operating opening in the panel so as to secure the members together in the manner of a rivet.

3. The manufacture according to Claim 2 in which said other member is of sheet material, and the protuberance is in the form of a cup-shaped projection, wherein the projection is fitted into an opening in the panel and is then deformed to cause its sides to extend outward beyond the rim of the opening and engage the outer surface of the panel around the opening, so as to hold the facing surfaces of the panel and member in contact with one another.

4. The manufacture according to Claim 2 in which said other member is of sheet material, and the protuberance is provided by a tubular projection, wherein the projection is deformed outwards to engage the outer surface of the panel around the opening, so as to secure the members together in the manner of an eyelet.

5. The manufacture according to Claim 2 in which said other member is of sheet material, and the protuberance is provided by a tab pressed out of the member, inserted through a co-operating hole in the panel and bent over against the surface of the panel.

6. The manufacture according to Claim 5 including a pair of said tabs, in which the tabs are fitted into a common opening in the panel and then bent outwards away from each other to engage the outer surface of the panel at opposite sides of the opening.

7. The manufacture according to any one of Claims 2 to 6 wherein the panel is a pre-painted panel.

8. The manufacture of a washing machine cabinet carried out substantially as shown in and as hereinbefore described with reference to Figure 1 and any one of Figures 2 to 9 of the accompanying drawings.

9. A washing machine cabinet manufactured according to any one of Claims 2 to 8.

10. A domestic appliance cabinet according to Claim 1 in which the protuberance extends into a co-operating recess in the panel so as to secure the panel and member against sliding movement in one or more directions parallel to their mating surfaces, and in which rivets or other fixing devices are additionally employed to giv added peel strength.

11. A domestic appliance cabinet according to any one of Claims 2 to 7 wherein rivets or other separate fixing devices are additionally employed to secure the panels together to give added pe l strength.

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